

3.5 FISH RESOURCES

Information in this section was gathered from the following sources:

- King County sensitive area map folio (King County 1990)
- 1992 Washington State Salmon and Steelhead Inventory (WDF et al. 1993)
- 1998 Washington State Salmonid Stock Inventory Appendix: Bull Trout and Dolly Varden (WDFW 1998)
- King County Basin Reconnaissance Program (King County 1987)
- A Catalog of Washington Streams and Salmon Utilization, Volume I Puget Sound (WDF 1975)
- Habitat limiting Factors and Reconnaissance Assessment Report for the Green/Duwamish and Central Puget Sound Watersheds (Water Resource Inventory Area 9 and Vashon Island) (Kerwin and Nelson 2000)
- U.S. Fish and Wildlife Service Species List (USFWS 2002)
- Washington Department of Fish and Wildlife Priority Habitats and Species Map and Reports (WDFW 2003)
- Preliminary Drainage report for Park Lake Homes Redevelopment (Goldsmith & Associates 2003)
- Scientific literature (various)
- Independent field review (The Watershed Company, 5 February 2003).

3.5.1 Affected Environment

Only an isolated section of an intermittent, non-fish bearing (King County Class 3) stream may be present on the project site, near the extreme southeast border. The project site does not adjoin any lakes or Puget Sound. The site occupies headwater areas of the Salmon Creek and Hamm Creek (Duwamish River) drainages. As such, no fish habitat is present on-site, nor are any fish.

The project site is divided among three drainage basins: east (Duwamish River), central (Lake Garrett), and west (Mallard Lake). While the entire site is technically located within the Duwamish-Green Basin (WRIA 9), the central and west basins are included within the Salmon Creek basin, which drains directly into Puget Sound to the west without ever entering the Duwamish River. The east basin contributes flow to the North Fork of Hamm Creek, which drains directly into the Duwamish River to the east within the river's zone of tidal influence. The Duwamish, in turn, discharges a short distance to the north into Elliott Bay at Seattle. All basins ultimately discharge to Puget Sound.

The only known potential stream section on-site, if confirmed, would be a short section of Class 3 stream in the Hamm Creek drainage identified by King County DDES staff during a site visit in 2001. By definition, King County Class 3 streams are intermittent (seasonal) and are not used by salmonid fish. The Class 3 stream channel section is reportedly located at the extreme eastern end of the site on the south side near the head of the modest ravine. It is reportedly fed by urban stormwater runoff discharge of sufficient flow to define a channel for a limited distance, but it may again lose its definition before its flow enters a piped system farther downslope.

Aquatic Species

The project site is in unincorporated King County bordering the City of Seattle to the north, and the receiving waters are in King County, the City of Seattle, and the City of Burien. King County and the City of Burien have identical stream rating systems that divide streams into three classes. Class 1 streams are shorelines of the state, Class 2 streams have perennial flow and/or salmonid use, and Class 3 streams are intermittent with no salmonid use. Within the Class 2 rating, streams with salmonid fish use are assigned wider buffers than those without. The City of Seattle has a two-tiered rating system that divides streams into Class A and Class B Riparian Corridors. Class A Riparian Corridors are established streams and lakes which flow year-around and/or support salmonids; Class B Riparian Corridors are intermittent streams without salmonids. The Duwamish River is a Class 1 stream and a Class A Riparian Corridor per King County and City of Seattle codes, respectively. Hamm Creek, in the Duwamish River basin, is partially in the City of Seattle (but not the North Fork), where it would likely be rated a Class A Riparian Corridor. The North Fork of Hamm Creek is only partially illustrated in the King County Sensitive Areas Map Folio, and has not been classified; however, it would be rated Class 2 Salmonid between the Duwamish River and State Highway 509, Class 2 Salmonid or 2 Perennial between Highway 509 and Myers Way SW, and Class 2 Perennial or 3 west of Myers Way SW. While the section of the North Fork between Highway 509 and Myers Way SW is inaccessible to migratory salmonid fish from farther downstream, it is possible that it supports or could support a few resident salmonid fish such as cutthroat trout.

Salmon Creek does not normally receive runoff from the project site. Instead, runoff water normally passes through storm drains and natural or man-made ponds before collecting in man-made Lake Garrett. From Lake Garrett, the water is pumped directly to Puget Sound in a storm drain that more or less parallels Salmon Creek for much of its length. While Salmon Creek does not *normally* receive any storm runoff water from this parallel storm drainage system and thus the project site, overflow discharges to the creek from the storm drainage system occasionally occur as a result of larger rainfall events. The open and piped pathways between the project site and Lake Garrett are all located in King County. The *King County Sensitive Areas Map Folio* does not classify these waterways.

Table 3.5-1 summarizes known or expected sensitive or salmonid aquatic species use in the relevant waterbodies as reported in the literature, indicated in state and federal agency maps and data, communicated by the local state biologists, and as observed in the field. A description of each species and its habitat requirements is provided in Appendix C of this Draft EIS.

Table 3.5-1
AQUATIC SPECIES USE OF PROJECT AREA WATERBODIES

Common Name Scientific Name Special status*	Project Area Waterbodies				
	Duwamish River	Lake Garrett and Tributaries	North Fork Hamm Creek	Salmon Creek	Puget Sound Nearshore
Chinook salmon <i>Oncorhynchus tshawytscha</i> FT, SCA	✓ ^{1, 2}		✓ ⁷		✓
Coho salmon <i>Oncorhynchus kisutch</i> FC	✓ ^{1, 2}		✓ ^{6, 7}	✓ (presumed historic)	✓
Chum salmon <i>Oncorhynchus keta</i> None	✓ ^{1, 2}			✓ ⁵ (historic)	✓
Sockeye salmon <i>Oncorhynchus nerka</i> None	✓ ^{1, 5}				✓
Pink salmon <i>Oncorhynchus gorbuscha</i> None	✓ ⁵				✓
Cutthroat trout <i>Oncorhynchus clarki</i> None	✓ ⁸		✓ ^{6, 7}	✓ ⁶	✓
Steelhead trout <i>Oncorhynchus mykiss</i> None	✓ ^{1, 2}		✓ ⁷		✓
Bull trout <i>Salvelinus confluentus</i> FT, SCA	✓ ^{1, 3, 4}				✓
River lamprey <i>Lampetra ayresi</i> SCA	✓				✓
Pacific lamprey <i>Lampetra tridentata</i> FSC	✓				✓
Sand lance <i>Ammodytes hexapterus</i> None					✓ ¹
Surf smelt <i>Hypomesus pretiosus</i> None					✓ ¹
Geoduck <i>Panopea abrupta</i> None					✓ ¹
* Status Codes: FT=Federal Threatened, FC=Federal Candidate, FSC=Federal Species of Concern, SCA=State Candidate Sources: ¹ WDFW 2003, ² WDF et al. 1993, ³ WDFW 1998, ⁴ USFWS 2002, ⁵ Kerwin and Nelson 2000, ⁶ Phil Schneider, ⁷ John Beal, ⁸ WDF 1975					

Aquatic Habitat Conditions and Fish Use

Duwamish River

The Duwamish River is 93 miles long and is identified as Water Resource Inventory Area (WRIA) 9, having a drainage area of 566 square miles in King and Pierce Counties. The river headwaters in the Cascade Mountains about 30 miles northeast of Mount Rainier and flows into Puget Sound at Elliott Bay in Seattle. The Green/Duwamish estuary has been largely eliminated over time with the growth of the City of Seattle and associated filling and other waterfront development activities. The lower Duwamish River is a highly industrial area with few natural habitat features. Water quality has also suffered (Kerwin and Nelson 2000). The 1992 Washington State Salmon and Steelhead Inventory (WDF et al. 1993) lists eight stocks of salmonid fish distinct to the river system including two stocks each of chinook, chum, and coho salmon, and steelhead trout (winter and summer). Winter steelhead enter the Duwamish River from November to April, and spawn in the Duwamish/Green basin between early March and mid-June (WDF et al. 1993). The exact spawning period for summer steelhead in the Duwamish River is unknown, but probably occurs in February through April, similar to other summer steelhead stocks in the Puget Sound (WDF et al. 1993).

Near the project area, both of the chinook salmon stocks inhabiting the Duwamish River basin can be identified as summer/fall stocks, spawning from September through October. These stocks are the Duwamish/Green stock, with spawning throughout the basin and hatchery production at Soos Creek, and the Newaukum Creek stock, made up of fish which spawn in lower Newaukum Creek. Both of these stocks are considered to be healthy (WDF et al. 1993).

Two stocks of coho salmon inhabit the Duwamish River basin. These are the Green River/Soos Creek stock, a healthy stock spawning throughout the basin from late October through mid-December, and the Newaukum Creek stock, a depressed stock spawning in the Newaukum Creek basin from late October through mid-January (WDF et al. 1993).

The Duwamish/Green chum stock is a fall stock of unknown status which spawns from late November through December in the mainstem Green River and side channels. A second chum stock in the basin is the Crisp Creek stock, which also spawns from late November through December. It is a hatchery stock with production at the Keta Creek facility (WDF et al. 1993).

According to WDFW (1998), "information on the presence, abundance, distribution, and life history of bull trout/Dolly Varden in the Green River basin is unavailable or extremely limited." One study cited by WDFW (1998) indicates that bull trout are present below Howard Hansen Dam, and WDFW maps (2003) report bull trout presence based on a submission by the U.S. Fish and Wildlife Service. However, there is no "confirmation or quantitative measure of bull trout/Dolly Varden natural production or juvenile rearing in the Green River basin" (WDFW 1998). The U.S. Fish and Wildlife Service included bull trout on its 2002 species list for the proposed project.

Though no stocks of pink or sockeye salmon were listed for the river in the 1992 Washington State Salmon and Steelhead Inventory (WDF et al. 1993), they were reported in the Habitat-limiting Factors and Reconnaissance report for the Green/Duwamish and Central Puget Sound Watersheds, as were cutthroat trout (Kerwin and Nelson 2000). Cutthroat trout can be expected to inhabit virtually all accessible streams within the basin to some extent, and resident populations will also occur upstream of some migration barriers. From 100 to 400 adult sockeye

are reported annually at the headworks of the City of Tacoma's diversion dam on the river, however, Eagle Lake (Enapooh Lake) is no longer accessible to sockeye, and it is the only lake of sufficient size in the basin to have historically provided rearing habitat for sockeye juveniles. It is not known whether or not the observed sockeye are successfully reproducing. WDFW (2003) also lists sockeye salmon presence in the Duwamish River.

Pacific and river lamprey are also presumed to be present in the Duwamish River.

North Fork of Hamm Creek

The North Fork of Hamm Creek (WRIA 09-0002) receives runoff from the eastern drainage basin of the project site and carries it to the Duwamish River. The majority of the stream is in a pipe under roads, an old gravel quarry, and heavily industrialized areas. However, two open sections, totaling approximately 1,560 linear feet, were located and assessed. Hamm Creek, which drains the eastern portion of the project site, enters the tidally influenced, lower portion of the river near River Mile 5 (Kerwin and Nelson 2000). Proceeding upstream from the Duwamish River, the first open section is just downstream (east) of the embankment of State Highway 509, continuing east to 8th Avenue South. The stream flows in a straight ditch underneath a recently cleared power line corridor located behind a number of heavy industries. Riparian vegetation is dominated by bittersweet nightshade, Himalayan blackberry, and reed canarygrass. Wetland fringe areas also contained soft rush. The substrate appeared to be primarily small gravel with some sand. The stream flows in a culvert under 8th Avenue South and then drops slightly into an open collection area, where it combines with flows from ditches and storm drains, including the flow from a tributary called the Mid Fork, joining on the east side of 8th Avenue South. The combined flow enters a large corrugated metal pipe.

A second open section of stream is located between State Highway 509 and Myers Way. The stream exits a metal pipe part way down the road embankment on the east side of Myers Way and disperses into a steeply-sloped field of boulders, presumably placed during road construction. Near the bottom of the slope, a concrete dam directs the water into a central hole at its base. The stream then flows into a large pool, possibly constructed to trap sediment, and then into a more natural channel. Just upstream of State Highway 509 is a "U"-shaped concrete flume with baffles, presumably designed to collect sediment and/or reduce flow velocities. At the end of the "U," stream flow plunges approximately 20 feet into a shaft topped by a trash rack and is then piped underneath the highway. The boulder field is barren, but the lower half of this stream section is flanked by a wide buffer vegetated with bigleaf maple, red alder, western hemlock, western red cedar, Sitka spruce, hazelnut, rose, osoberry, and sword fern. A few patches of slough sedge, soft rush, and buttercup are also present at the stream edge. Students at Evergreen High School planted many of the native plants close to the stream, particularly the conifer species. The substrate in the natural stream section is a well-graded mix of gravels and the low banks appear stable. The upstream pool and the concrete flume have sediment and fine sand substrates. A few pieces of downed wood are also present in the natural portion of this stream section.

Stream flows in all forks of Hamm Creek have exhibited evidence of water quality degradation typical of streams in urbanized settings during storm events. Metals such as zinc, copper, and lead have been measured at high concentrations during these storm events. In addition to the high metal concentrations, high concentrations of total suspended solids and total petroleum hydrocarbons (TPH) have been measured at sampling locations throughout the streams with only minor exceptions (King County 1994; King County 1995a). Elevated pH with values up to

8.72, sampled during base flow conditions, have been attributed to runoff from a cement kiln dust pile located in the vicinity of South 96th Street and 10th Avenue South (King County 1994).

Fish passage into the Middle and North Forks is partially obstructed by a perched culvert outfall into the Duwamish River. However, since the outfall is located within a reach of the river that is subject to tidal influence, adult and juvenile salmonids can enter the system when the tide reaches an elevation of approximately +6.5 feet or higher (Kerwin and Nelson 2000). The lower, piped section of this stream may also inhibit salmonid migration. While the gradient is relatively flat, the lack of suitable holding areas and darkness may inhibit some upstream salmonid migration.

No fish were observed in the first open section during the February 2003 site visit. However, an employee of Security Construction Services reported last seeing adult salmon (likely coho) migrating upstream in 2001 and previous years. According to the employee, salmon are stranded on the road and in the paved storage yard during floods. Maps posted by the I.A.M.A.P.A.L. Foundation (I'm a Pal) at the North Fork, Marra Farm restoration site indicate that salmon have been observed up to State Highway 509. Phil Schneider of King County, formerly with WDFW, indicated that he had captured both juvenile coho and cutthroat in the North Fork under the power lines extending up to SR 509 (Schneider, pers. comm., 20 February 2003). John Beal, with the I.A.M.A.P.A.L. Foundation, indicated that he has videos of adult coho and chinook salmon, and cutthroat and steelhead trout using the North Fork (Beal, pers. comm., 20 February 2003).

No fish were observed in the second open section during the February 2003 site visit. While it is not accessible to migratory fish from downstream, it may be possible for a few resident fish, such as cutthroat trout, to live in this section.

Salmon Creek (WRIA #09-0362)

Salmon Creek flows into Puget Sound near SW 125th Street out of a system of steeply sided, somewhat unstable ravines. The creek and its tributaries have cut deeply into the local, glacial sediments, resulting in steep and inherently unstable sideslopes. Both slow and rapid earth movements occur on the sideslopes and streambanks. The lowermost section of the creek, downstream of Shorewood Drive SW, has been lined with rock and is channelized (King County 1987). A sewage treatment plant lies just upstream of Shorewood Drive SW on the south side of the stream.

As described previously, the stream has been piped in the northern and central portions of the basin, which include the project area, collecting flows from upstream of Lake Garrett. Storm runoff water from the project site flows through various ponds, wetlands, and piped sections by two separate pathways to reach Lake Garrett. No fish are believed to inhabit these drainage pathways located in the upper watershed. As mentioned previously, storm runoff surface flows originating from on-site are normally kept entirely separate from the flows in Salmon Creek, since they flow into Lake Garrett, and water from Lake Garrett is normally pumped to an outfall at Puget Sound which is distinct from the mouth of Salmon Creek. However, in response to high flow events exceeding a certain threshold, some stormwater overflows from this storm drainage system are reportedly discharged to the creek (Barber, pers. comm., 11 February 2003).

Resident cutthroat trout are reported to use the creek at least up to river mile (RM) 0.8, but there are no documented present-day salmon runs up the stream (Schneider, pers. comm., 20 February 2003). An absolute block to upstream fish migration occurs near the stream's mouth, where there is a 4-foot-high waterfall with no pool (King County 1987). This plunge at the mouth is apparently the result of shoreline armoring (bulkhead construction) - the stream is now reported to plunge over the top of the bulkhead with little or no pool below, resulting in a complete barrier to upstream migration (Schneider, pers. comm., 20 February 2003). While the name of the mainstem creek suggests that anadromous salmonids may have been historically present, there have been no recent observations of any species of anadromous salmonids in this system (Kerwin and Nelson 2000). The only recorded observations are from a spot spawning ground survey conducted on 27 December 1956. As reported in Kerwin and Nelson (2000), 128 chum salmon adults were observed in unnamed tributary 09-0365, and 95 chum salmon adults were observed in unnamed tributary 09-0366. If chum salmon used the creek historically, it is possible and likely that coho did as well.

Puget Sound

Puget Sound habitat has been impacted by a variety of human activities which have modified the shoreline condition and function, and have impacted water quality. Shoreline development and clearing has reduced the amount of woody materials lining the shore, and artificial shoreline armoring has reduced substrate material supply, affecting the composition of many beach areas. As mentioned for the Duwamish, many estuary areas, important for the rearing of juvenile fish during their period of transition to sea water, have been filled for industrial or other development, or diked and drained for agricultural uses. The Nisqually delta and estuary is among the least impacted in Puget Sound, though some of it has a history of agricultural use.

Juveniles of all the species of anadromous fish mentioned in this report are expected to occupy nearshore marine environments in the project vicinity to some degree. Near the project area, sand lance spawning areas have been mapped along the nearshore of Puget Sound north of the mouth of Salmon Creek and surf smelt spawning areas have been mapped along the nearshore of Puget Sound south of the mouth of Salmon Creek (WDFW 2003). Extensive geoduck tracts occur along the eastern shore of Puget Sound between Tacoma and Everett, which includes the shore of Puget Sound directly to the west of the project area and offshore from the mouth of Salmon Creek, the storm drainage outfall ultimately draining the site, and the sanitary sewer outfall from the treatment plant near the mouth of Salmon Creek (WDFW 2003).